

**COMPARATIVE STUDY OF THE PREGNANCY  
OUTCOME WITH INDUCTION AT 40 WEEKS AND 1  
WEEK BEYOND EXPECTED DATE OF CONFINEMENT**

*Dissertation submitted for*

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# *Introduction*

## **INTRODUCTION**

Human Birth is a gift, and God has empowered the obstetricians, the duty of delivering a good intact well fetus to make a healthy future generation.

India being the second largest population country in the world next to China, has implemented family welfare program in a large scale and now the acceptance rate of small family norm has gained popularity in India. So every pregnancy is important, every baby is precious.

Prolonged pregnancy causes anxiety and distress for many women, their families, midwives and obstetricians. The main reason for this is the risk of late IUD which may occur while the baby remains in Utero, Despite many trials, there is still no consensus regarding the most appropriate management of this difficult situation. There in many instances the decision as to whether to intervene in a prolonged pregnancy is based on tradition and emotion rather than scientific data.

Herein this study we compare the pregnancy outcome of those intervened at forty weeks of gestation and those at forty one weeks and thereby arriving at an optimum period for intervention in these pregnancies.

As many people in India live in villages, with inadequate approach to health care facilities and also due to illiteracy, many women come to our hospital beyond 40 – 41 wks of gestation. Such patients are included in one group for the purpose of study.

The problems associated with pregnancy that cross expected days of delivery are:

1. Mother become anxious and fears any danger for the fetus.
2. Mother is at increased risk of operative delivery.
3. Fetus is at increased risk for post maturity, fetal distress, Meconium stained Amniotic fluid, Meconium Aspiration Syndrome, Fetal Heart rate abnormalities.

In this study the outcome of pregnancies that crossed the expected date of delivery have been studied in Govt. Raja Sir Ramasamy Mudailar lying in Hospital, Chennai.

*Aim of the study*

**COMPARATIVE STUDY OF THE PREGNANCY OUTCOME  
WITH INDUCTION AT 40 WEEKS AND 1 WEEK BEYOND  
EXPECTED DATE OF CONFINEMENT**

**AIM OF THE STUDY**

1. To analyse the optimum period of intervention in pregnancies without compromising the Fetomaternal outcome.
2. To evaluate the maternal and perinatal outcome when labour is induced at 40 weeks gestation.
3. To evaluate the maternal and perinatal outcome when the labour is induced 1 week beyond the expected date of confinement.



*Review of  
Literature*

## **REVIEW OF LITERATURE**

As long ago as 399 BC Aristotle appreciated that the gestation period for human pregnancy varied considerably and that prolonged pregnancy was not uncommon. He wrote:

“Now all other animals bring the time of Pregnancy to an end in a uniform way; in other words, one single term pregnancy is defined for each of them. But in the case of mankind alone of all animals, the times are diverse for pregnancy may be seven months duration or of eight months or of nine and still more commonly of ten (10) months. Whilst some women go even into the eleventh month” (Aristotle works Vol. II).

In 1883, a woman who was pregnant for 476 days, gave birth to a boy baby weighing 13 lb (5.8 kg).

The standard internationally recommended definition of prolonged pregnancy endorsed by American College of obstetricians and gynecology is 42 completed weeks (294 days) or more from the first day of Last Menstrual Period (LMP).

The expressions post date and post term are used synonymously to describe a pregnancy which exceeds 294 days from LMP assuming a 28 days cycle (FIGO 1980).

However, confusion exists because the term post maturity, which is often used synonymously with prolonged pregnancy, actually describes the state of the baby.

### **Normal Duration of Pregnancy**

Modern obstetrics still support Naegele's rule which adds 280 days or 9 Calendar months plus 7 days to the last menstrual period (Naegele 1812).

Although other studies have shown some variation in the mean length of gestation.

### **Average Duration of Pregnancy**

<b>S.No.</b>	<b>Author</b>	<b>Method of Assessment</b>	<b>Days from LMP</b>
1.	Naegele (1812)	LMP	280
2.	Cary (1948)	Artificial Insemination	285 (271 from conception)
3.	Kortenoever (1950)	LMP	282 (280 – 284)
4.	Stewart (1952)	Basal Body Temp.	266 – 270 from conception
5.	Park (1968)	LMP	287 – 289
6.	Guerrero and Florex	Basal Body Temp	280
7.	Nakono (1972)	LMP	278

### **INCIDENCE**

Range from 4 to 14% with an average of 10%. Boyd et al found an incidence of post term pregnancy of 7.3% when diagnosis was based on menstrual cycle dates and incidence was 2.6% when dates was made by ultrasound and menstrual history.

**A etiology commonly implicated are:**

**1. Seasonal Variation**

Longer in summer than in winter with an average difference of 2.5 – 4 days.

**2. Improved living Standard**

May lead to prolonged pregnancy was raised with the knowledge that poor nutrition leads to prematurity.

**3. Hereditary and Racial Factors**

Prolonged pregnancy tends to recur in successive pregnancies in the same woman and the condition often runs in families.

Surveys have shown a significantly shorter mean length of gestation and lower frequency of pregnancies which continue beyond 42 wks gestation in black than in white women. This difference has not been observed in Asian Women.

**4. Hormonal Influence**

Estrogen and cortisol play a role in initiation of labour. A defect in the pituitary – adrenal axis may be of importance in prolonged pregnancy and occurs in cases of anencephaly. However, there is little evidence of endocrinological defects in the majority of prolonged pregnancies.

**PHYSIOLOGICAL CHANGES ASSOCIATED WITH PROLONGED GESTATION/ AMNIOTIC FLUID CHANGES:**

Amniotic fluid which serves as a cushion and protects the fetus, has the following changes in the volume at their particular age of gestation.

At 16 weeks - 200 ml

At 28 weeks - 1000 ml

At 36 weeks - 900 ml

At 40 weeks - 800 ml

At 42 weeks - 480 ml

At 43 weeks - 250 ml

At 44 weeks - 160 ml

Oligohydramnios is defined as Amniotic fluid index of 5 cm or less by sonar or a largest vertical pool  $\leq 2$ cm excluding the loop of cord. The major determinants of Amniotic fluid in mature fetus being fetal urine output and fetal swallowing.

Inadequate placental function in post term pregnancy may cause fetal hypoxemia followed by decreased fetal urine production leading to Oligohydramnios.

Veille *et al.*, used pulsed Doppler wave forms and reported that renal blood flow is reduced in post term pregnancy resulting in oligohydramnios which is associated with fetal hypoxia is caused by placental dysfunction.

Renal artery Doppler was more predictive of oligohydramnios than umbilical RI, the reduced renal artery end diastolic velocity suggest increased arterial impedance and an important factor in development of oligohydramnios in prolonged pregnancies.

The qualitative changes in Amniotic fluid:

1. Fluid becomes milky and cloudy because of flakes of vernix caseosa.
2. The phospholipids composition changes because of the presence of large number of lamellar bodies released from fetal, lungs and L:S ratio becomes 4:1.
3. The color of fluid becomes green as fetus passes meconium.

### **DRISCOLL'S CLASSIFICATION OF MECONIUM STAINED AMNIOTIC FLUID**

Grade I - Lightly meconium stained that is transparent when collected in test tube.

Grade II - Opaque and green colored meconium in Amniotic fluid.

Grade III - Meconium undiluted with Amniotic fluid.

### **PLACENTAL CHANGES**

1. Decrease in diameter of placenta and length of chorionic villi.
2. Fibrinoid Necrosis.
3. Accelerated atherosclerosis of chorionic and decidual vessel.
4. Appearance of hemorrhagic infarcts which are foci of calcium deposition and formation of white infarcts. These present in 10-25% of term and 60-80% of post term placentas, and are common in placental borders.

Placental apoptosis - programmed cell death was significantly increased in pregnancies reaching 41 weeks or more, compared with 36 to 39 weeks. Cord plasma erythropoietin level significantly increased in pregnancies reaching 41 weeks or more and conclude some decreased fetal oxygenation in some post term gestations.

Continued fetal growth been observed upto 42 weeks and post term fetus may continue to gain weight and be a large infant.

## **FETAL CHANGES AND PROBLEMS**

### **1. Post maturity syndrome**

Post maturity is used to describe the features of neonate who appears to have been in uterus longer than 42 weeks of gestation.

#### **Features of Post maturity Syndrome**

Absence of vernix Caseosa

Absence of Lanugo Hair

Abundance Scalp Hair

Long Finger Nails

Dry Cracked desquamated skin

Body Length increased in relation to body weight

Alert and apprehensive facies.

Meconium staining of skin and Membranes.

Dysmaturity in 41 – 42 weeks 2-3%

> 42 weeks 20 – 43%

and 44-45 weeks 75%

## **2. Macrosomia**

The risk of macrosomia is maternal and fetal trauma from delivery.

Incidence of shoulders dystocia for a macrosomic infant is 2%.

## **3. Meconium stained amniotic fluid**

Incidence MSAF at 40 weeks - 30%

Incidence MSAF at 42 weeks - 50%

The passage of meconium appears to be normal in a mature fetus, as the Amniotic fluid decreases, the meconium that is passed, become thick and leads to meconium below the level of vocal cords of infant leads to meconium aspiration syndrome. The presence of meconium in AF warrants continued fetal monitoring.

## **4. Meconium aspiration syndrome**

Meconium in post dated is dangerous, as it contains particulate matter like lanugo cells, hair etc that set up chemical pneumonitis in infants, and vicious cycle set up. i.e. hypoxemia and pulmonary hypertension.



**5. Intra uterine growth restriction**

USG estimation of fetal weight is a useful test in predicting IUGR in prolonged pregnancy. IUGR is independently associated with increased Perinatal Mortality Rate in these pregnancy.

**6. Neonatal intensive care and admission rate**

Neonatal intensive care and admission rate is increased as the main problem they face in intrapartum asphyxia, MAS, MSAF,

**7. Fetal distress**

Antepartum and intrapartum variation in FHR due to cord compression. partly due to decreased amniotic fluid volume and partly due to decrease in whartons jelly

**ELECTRONIC FETAL MONITORING SHOWS**

1. Variable deceleration with slow recovery.
2. Fetal Bradycardia with loss of beat to beat variability.
3. Repetitive late deceleration.
4. Salutory Baseline.

Silver and colleagues reported that decrease in umbilical cord diameter ultrasonically was indicative of intrapartum fetal distress, especially if associated with oligohydramnios.

## **8. Oligohydramnios**

Amniotic fluid increase from 10 - 20 ml at 10 weeks of gestation to 800ml at term (40 weeks). In post dated pregnancies, both fetal hypoxia and placental dysfunction (insufficiency) cause oligohydramnios.

It is defined as no vertical pocket of Amniotic fluid greater than 2 cm or an Amniotic fluid index (API) 5 cm or less, and it is detected by ultrasound<sup>19</sup>. Its an indication for delivery or close fetal surveillance. It is associated with potential complications such as fetal heart rate decelerations and meconium staining.

In prolonged pregnancies, cardiac function deteriorates in fetuses that develop non reassuring intrapartum FHR, and the changes in the left cardiac functions correlate with changes in AP.

## **ANTEPARTUM EVALUATION**

The reliability of EDD is excellent, if following criteria are met.

1. The women had 3 regular cycles and periods before the last one and last period normal in duration and amount of flow with ,no recent use oral contraceptive pills (before 3 month).

PLUS

An ultrasound examination between 16-24 weeks indicates fetal measurement coincide with clinical gestational age. ACOG criteria for gestational age of 39 weeks and above, if any one criteria is met with:

1. FHS documented at 20 weeks by non electronic fetoscope or 30 weeks by Doppler.
2. It has been 36 weeks since a positive serum urine chorionic gonadotropin and performed by a reliable laboratory.
3. An USG measurement of crown rump length obtained at 6-11 weeks support GA of 39 weeks.
4. USG obtained at 12-20 weeks confirms the GA at least 39 weeks determined by clinical and physical examination and also if pregnancy achieved during infertility treatment following administration of clomiphene, HCG, date of conception is known. At all gestation ages, ultrasound was superior to certain LMP in predicting the day of delivery by at least 1.7 days crown rump measurement of 15 -60 mm (corrected to 8-12.5 weeks) had the lowest prediction error (7.3 days) and more after that time, BPD atleast 21mm, showed similar error 7.3 days and more precise than crown rump length (23). When USG was used instead of certain LMP, the number of post term pregnancies decreased from 10.3 to 2.7%

Tuncon et al concludes from 15,000 examinations that biparietal diameter measured between 15-22 weeks of pregnancy is the best method for estimation of day of delivery and should be used as delivery and should be used as a routine procedure.

## **ROLE OF SCAN**

Using 'B' mode ultrasound, amniotic fluid index calculated. The maternal abdomen divided arbitrarily into four quadrants by 2 lines, one passing vertically and another horizontally bisecting the umbilicus. The amniotic fluid in all quadrants measured after excluding loops of cords and all the quadrants values summated and that is AFI described by Phelan et al (1987) normal AFI-14, Oligohydramnios is decreased 5 cm or less.

The infusion studies suggest that a near term mean AFI of 14 is equivalent to 700 ml, a value similar to that noted by Bruce Wolf et al that is 717 ml. Magnan *et al*, Didley et al used (PAH) showed AFI more reliable is identifying the extremes of Amniotic Fluid compared to max. vertical pocket.

## **FETAL SIZE:**

Estimation of fetal size is another component in evaluation of pregnancy crossing beyond the dates, and to identify the macrosomic fetus by measuring the fetal abdominal circumference, and fetal growth restriction. IUGR is independently associated with perinatal mortality.

Any congenital abnormalities like open neural tube defects, can be detected and hence early termination advised, or else if not detected they are prone for prolonged pregnancies.

As stated earlier, early dating scan reduces the incidence of prolonged pregnancy from 10 to 2%, Gardosi and Geirsson argue routine scan is method of choice in dating all Pregnancies.

## MANAGEMENT

### Crossed expected date of delivery, when to induce?

Some obstetric units practise routine induction of labour at 40 completed weeks in uncomplicated singleton pregnancies. Routine Per vaginal examination done to assess **the cervical score by Bishop's** method.

### BISHOPS SCORE

Score	Dilatation (cm) closed	Effacement %	Station	Cx-Consistency	Cx - Position
0		0-30	-3	Firm	Position
1	1-2	40-50	-2	Medium	Posterior
2	3-4	60-70	-1	Soft	Midposition
3	> 5	>	+1+2	-	Anterior

Induction of labour is usually successful when score is 6 (or) greater<sup>25</sup>

Six Randomised Trials compare a policy of routine Induction at 40 weeks with either expectant management till 42 weeks gestation<sup>30</sup>.

There was no effect on caesarean section or use of analgesia. But Meconium staining of AF in labour is reduced by Planning induction around 40 weeks.

Those authors of the trials did not address the important question of women's view of induction of labour at this stage of pregnancy<sup>27</sup>. (Turnbull)  
1 study of Roberts et al showed that majority (55%) opted for induction of Labour.

Here in our country only 20% of the people wanted to go by conservative line of Management (28) Rest 80% wanted to get some form of induction, even at the cost of their morbidity (caesarean section) as our society view if such Femininity is 100% fruitful (complete) only after giving birth to a baby.

## **THE FETAL SURVEILLANCE TESTS IN CONSERVATIVE MANAGEMENT**

### **1. Non Stress Test (NST)**

- Reactive - 2 accelerations ( $\geq 15$  bpm above baseline lasting for  $\geq 15$  sec) in 20 mins.
- Nonreactive - After 40 min no acceleration.

## **2. Contraction Stress Test (CST)**

IV oxytocin or Nipple Stimulation until patient has 3 contractions in 10 mins.

Negative : No decelerations

Positive : Repetitive late decelerations (or) variable Deceleration,

Suspicious : Isolated late (or) variable decelerations.

## **3. BPP**

Reactive NST, Fetal Breathing, Extension / Flexion, Gross Body movement, 2 x 2 cm liquor pocket; 2 points for the presence of each variable.

## **4. Doppler**

Multiple studies assessing almost any vessel suggest Doppler is not helpful even during Absent end diastolic flow. ACOG continues to consider this investigation,

## **5. Fetal kick count.**

By means of 'Cardiff count of 10'. 2 RCT tested the fetal kick chart value in management protocol, these prove that routine formal fetal movement doesn't reduce incidence of Intra Uterine Death in late pregnancy .

The lowest perinatal mortality and morbidity was seen in the scheme in which semi weekly NST/Weekly AFI were performed<sup>29</sup>.

## **BIOPHYSICAL SCORE (BPP)**

COMPONENT		SCORE 2	SCORE 0
1.	NST	$\geq 2$ acceln of $\geq 15$ bpm for $\geq 15$ sec. in 20-40 min	0/1 acceleration in 20-40 min
2.	Fetal Breathing	$\geq 1$ episode of rhythmic Breathing	$\leq 30$ sec of Breathing in 30 min
3.	Fetal movement	$\geq 3$ discrete body or limb movement in 30 min	$\leq 2$ movement in 30 mins
4.	Fetal tone	$\geq 1$ episode of extension of a fetal extremity and return or to flex and extend the hand	No movements, no flexion (or) extension
5.	Amniotic fluid Volume	Single vertical pocket $\geq 2$ cm	Largest vertical pocket $\leq 2$ cm.

Normal score - 8 - 10 = Normal fetus

Equivocal - 6 - Poor predictor of fetal outcome

2-4/0 - Accurate predictor of Abnormal outcome.

## CERVICAL RIPENING

By means of which the cervix becomes soft, distensible and partially dilated is necessary for normal parturition. Biochemical mechanism responsible for this is poorly understood.

Cervix contain 25%, 16% 6% of smooth muscle in upper, middle a lower segments respectively, change that take place in collagen and in connective tissue matrix are primary factors for cervical ripening, collagen breakdown occur and is due to Hormones and prostaglandins, cervical. Tissues



have the ability to generate prostaglandins and this endogenous prostaglandins participate in Ripening process.

## **I. Medical methods for ripening**

### **1. PGS:- PGE<sub>2</sub>, PGF<sub>2</sub> a can be used**

PGE<sub>2</sub> is more effective

#### Intravaginal

-2.5 mg PGE<sub>2</sub> Biodegradable pessary (or) gel

-5 to 10 mg PGE<sub>2</sub> Biodegradable

#### Intracervical

-0.5 - 1 g PGE<sub>2</sub> viscous cellulose gel

Misoprostol [PGE<sub>2</sub>] 100-200 µg tablets are effective and cheaper than PGE<sub>2</sub>

### **2. Mifepristone (RU 486)**

200 mg oral for 2 days, 48 hrs before induction

### **3. Oxytocin**

### **4. Estradiol 150-300 µg in Tyloses gel can be used extra amniotically, intra cervical/vaginally**

### **5. Relaxin 1-4 µg purified porcine in gel applied vaginally / intra cervically.**

## **II. Mechanical Ripening**

1. Laminaria tents
2. Lamicel - synthetic sponge impregnated with Magnesium Sulphate
3. Dilapan
4. Foley's catheter with Balloon inflated with 30 ml of saline cases ripening by
  - i. Direct pressure and overstretching of lower uterine segment.
  - ii. Local release of Tissue PGs.

### **VARIOUS METHODS OF INDUCTION OF LABOUR**

1. Sweeping of membranes (or) stripping is Intentional digital separation of chorionic membranes from lower uterine segment at Term, Introduced by Hamilton at 1810. It is associated with increase in phospholipase A<sub>2</sub> activity and prostaglandin F<sub>2</sub> a concentrate indicating a correlation with initiation of cascade of parturition. At 38-40 weeks if it is done, is safe and  
  
Associated with earlier delivery.
2. Intracervical PGE<sub>2</sub> gel.
3. Early amniotomy at 2-3 cm dilatation of cervix,
4. Oxytocin, starting dose of 1-4 mu/min and gradually increase till effective contractions are established.
5. Nipple stimulation

# *Materials and Methods*

## **MATERIALS AND METHODS**

This prospective study was done at Govt. RSRM Hospital (Raja Sir Ramasamy Mudaliar Lying in Hospital), attached to the Stanley Medical College, Chennai, study period being one year from August 2006 to July 2007.

The study population selected for inclusion was based on the following criteria.

1. Singleton pregnancy
2. Reliable dates with definite menstrual history with atleast 3 regular cycles before last periods.
3. No recent use of oral contraceptives.
4. Gestational age equal to or one week more than 40 weeks.
5. Age of mother being 15 – 44 years.
6. Bishop Score < 6

Gestational Age was based on the Mother's statement of first day of last menstrual period. Then clinical examination, NST and ultrasound examination were carried out. Fetal presentation, position, maturity and amount of liquor assessed. The estimated baby weight assessed, and bimal examination done to know the Bishop's Cervical Score.

The study group consisted of 96 women with 41-42 completed weeks of gestation all of them were booked elsewhere and admitted through casualty. They were unaware of the significance of prolonged pregnancy due to either

illiteracy or lack of easy approach to the health system. They had induction either by prostaglandin E<sub>2</sub> gel (or) Oxytocin according to cervix status. Active management of labour done, by amniotomy and oxytocin. Colour of liquor noted, and Amnioinfusion given if it is meconium stained using normal saline at room temperature.

The mode of delivery decided accordingly and neonate inspected for evidence of postmaturity syndrome, macrosomia, IUGR.

The control group consisted of 104 women picked up from antenatal op at 40 completed gestational weeks and induction attempted immediately. They all underwent NST and ultrasound examination and induction was followed by Active management of labour. The colour of liquor, Baby's condition at birth, labour and outcome studied.

Maternal outcome in form of vaginal delivery, instrumental (or) operative vaginal delivery and caesarean section evaluated in both these groups.

Neonatal / Perinatal outcome evaluated which comprised of:-

1. Meconium staining at labour of Amniotic fluid (MSAF)
2. Meconium Aspiration Syndrome (MAS)

3.     Macrosomia
4.     Intra Uterine Growth Restriction
5.     Neonatal Intensive care unit (NICU) admission rate
6.     Apgar Score  $<7$  at 5 minutes.

*Observation*

## OBSERVATION

Table : 1

### DISTRIBUTION OF PREGNANCIES ACCORDING TO SOCIO ECONOMIC CLASS

SE CLASS	Study group	Control group
Class I	-	-
Class II	-	-
Class III	3	4
Class IV	26	26
Class V	60	81
<b>TOTAL</b>	<b>89</b>	<b>111</b>

Table : 2

### DISTRIBUTION OF WOMEN ACCORDING TO THE NUMBER OF DAYS OVERDUE

	PRIMIGRAVIDAE	MULTIVRAVIDAE	TOTAL
Control group	69	35	104
Study group	57	39	96
<b>TOTAL</b>	<b>126</b>	<b>74</b>	<b>200</b>

Total number of primigravida constitute 126 (63%) and multigravidae 74 (37%)

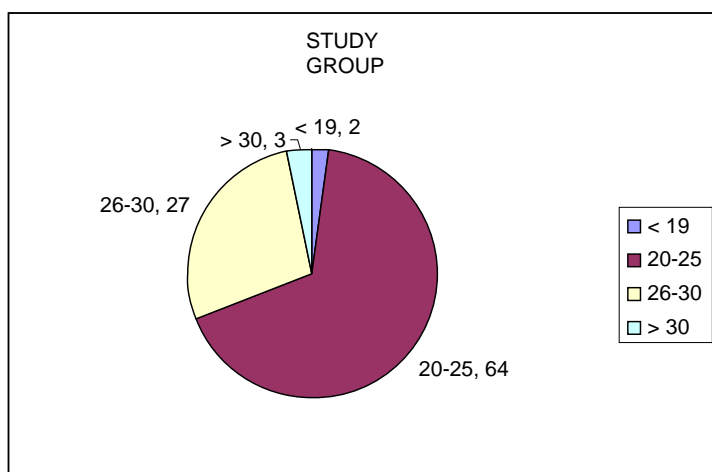
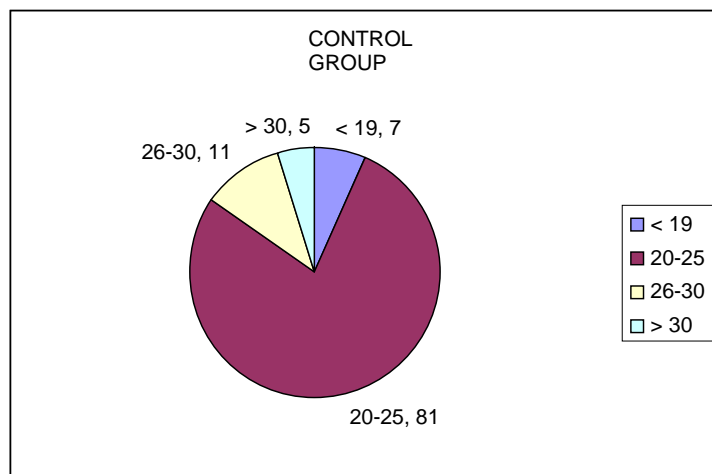


**Table : 3**

**DISTRIBUTION OF AGE GROUP**

AGE	Control group	Study group	TOTAL
< 19	7	2	9
20 – 25	81	64	145
26 – 30	11	27	38
> 30	5	3	8
<b>Total</b>	<b>104</b>	<b>96</b>	<b>200</b>

Major Women belong to 20 – 25 age group 72.5%, Next group is 26 – 30 group 19%

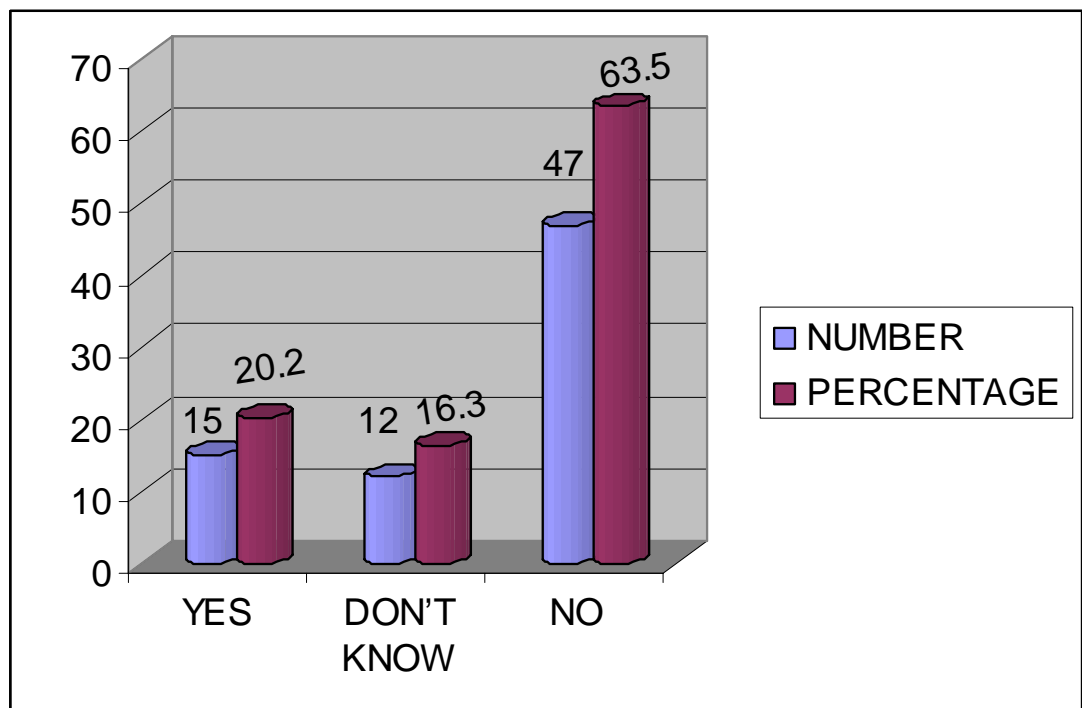


**Table : 4**

**HISTORY OF PREVIOUS POST DATED PREGNANCY**

HISTORY	NUMBER	PERCENTAGE
YES	15	20.2
DON'T KNOW	12	16.3
NO	47	63.5
<b>TOTAL</b>	<b>74</b>	<b>100</b>

Patient with history of previous postdated pregnancy constitute 15 (20.2%)



**Table : 5**

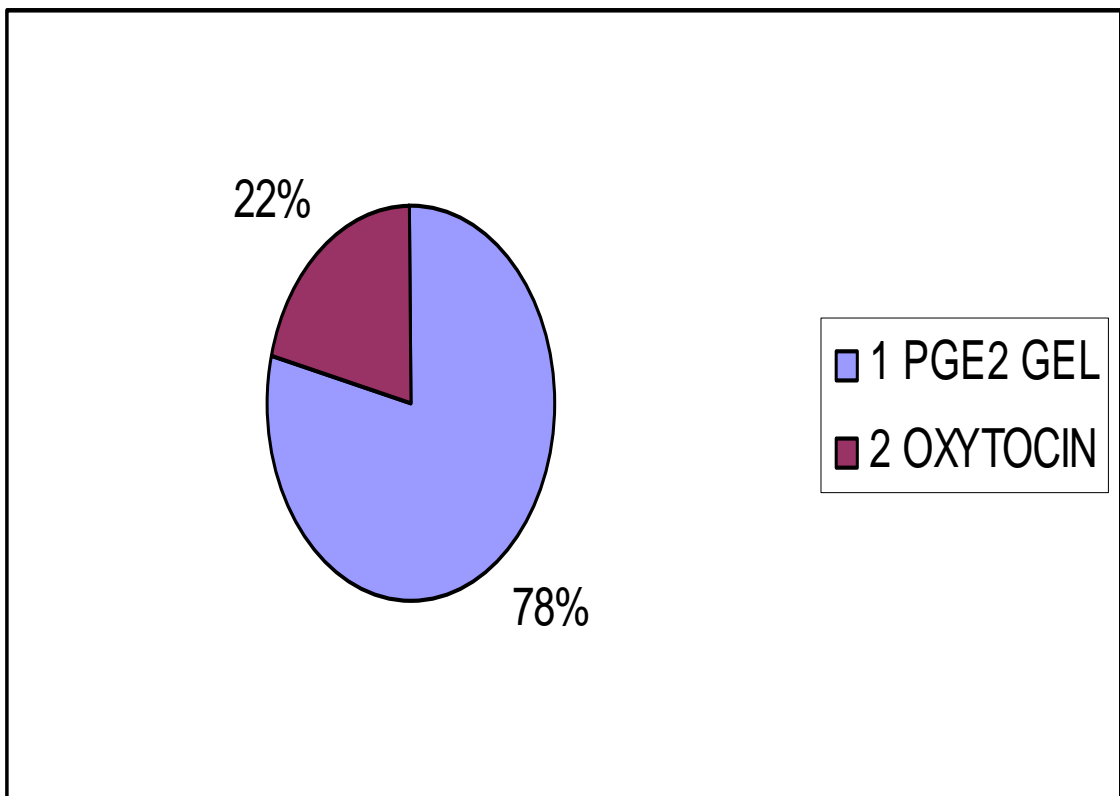
**SCAN FINDINGS LIQUOR VOLUME**

<b>AFI</b>	<b>Control group</b>	<b>Study group</b>
< 5	2	1
5 – 8	12	13
8 – 10	65	52
> 10	24	29
HYDRAMNIOS	1	1
<b>TOTAL</b>	<b>104</b>	<b>96</b>

**Table : 6**

**MODES OF INDUCTION IN CONTROL GROUP**

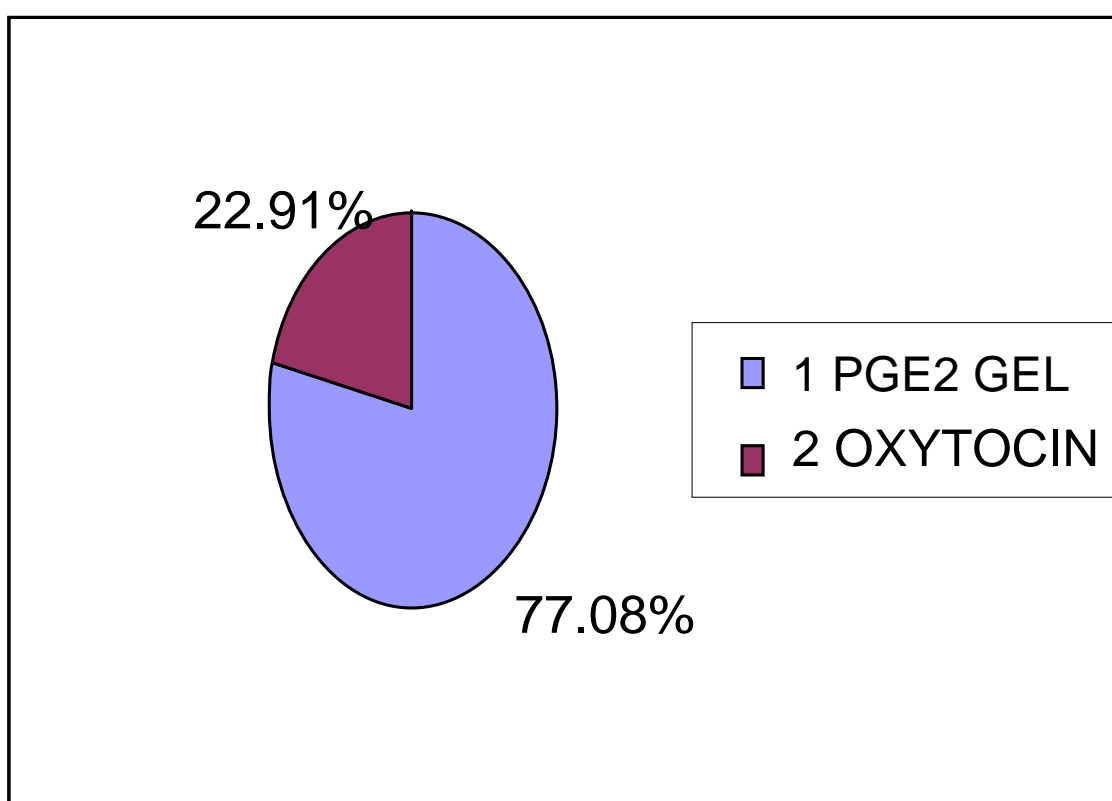
1.	PGE <sub>2</sub> GEL	157	78.5%
2.	OXYTOCIN	43	21.5



**Table: 7**

**MODES OF INDUCTION  
IN STUDY GROUP**

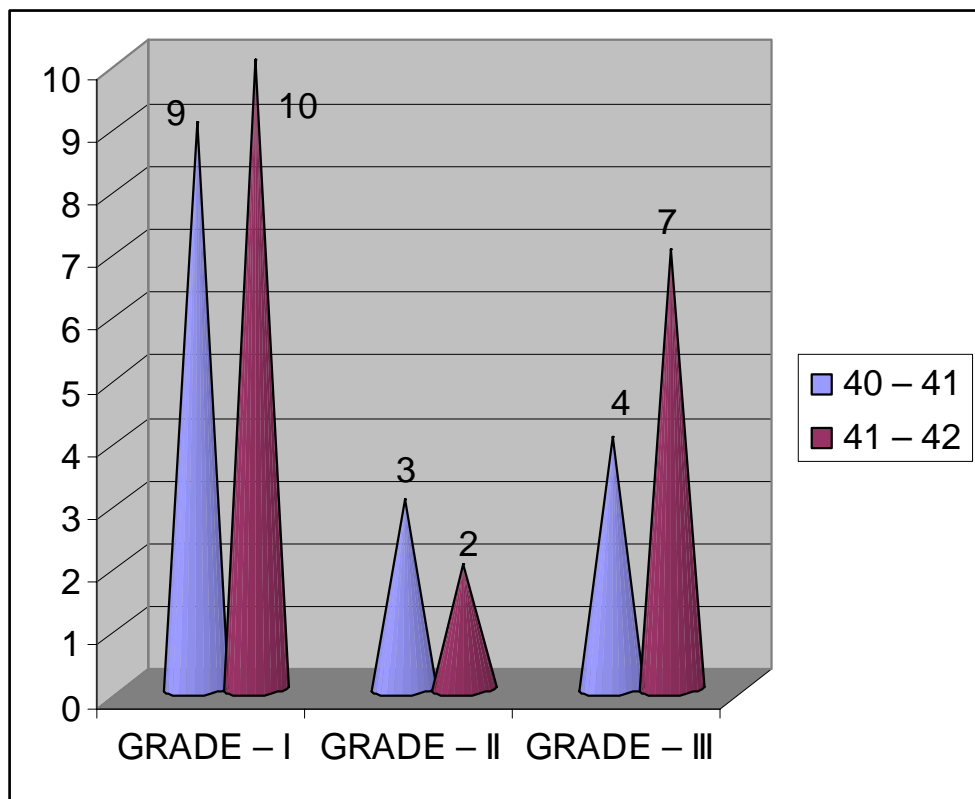
1.	PGE <sub>2</sub> GEL	74	77.08%
2.	OXYTOCIN	22	22.91



**Table : 8**

**MECONIUM STAINED AMNIOTIC FLUID**

<b>WEEKS</b>	<b>GRADE – I</b>	<b>GRADE – II</b>	<b>GRADE – III</b>	<b>TOTAL</b>	<b>%</b>
Control group	9	3	4	16	15.5%
Study group	10	2	7	19	20%

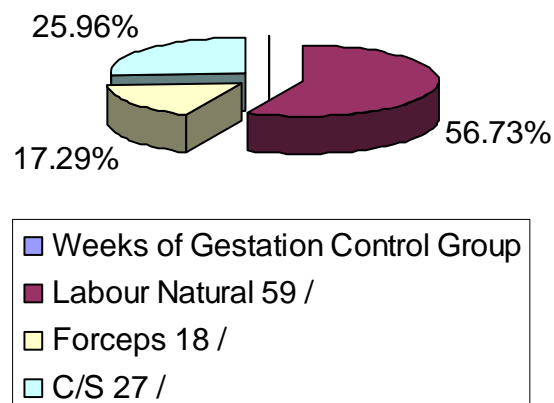


**Table : 9**

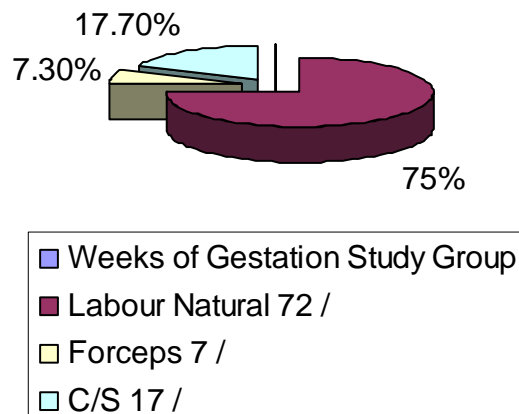
**MODE OF DELIVERY**

<b>Weeks of Gestation</b>	<b>Labour Natural</b>	<b>Forceps</b>	<b>Total Vaginal Delivery</b>	<b>C/S</b>
Control Group	59 56.73%	18 17.29%	77 74.02%	27 25.96%
Study Group	72 75%	7 7.3%	79 82.3%	17 17.7%

**CONTROL GROUP**



**STUDY GROUP**



# *Statistical Analysis*



## STATISTICAL ANALYSIS

To compare the Statistical Significance of Caesarean Section in A & B

	C/S	V/D	Total
A (Control Group)	27	77	104
B (Study Group)	17	79	96
	44	156	200

$$\text{Proportion for C/S} = 44/200 = 0.22$$

$$\text{Proportion for V/D} = 156/200 = 0.78$$

$$\text{Exp. Rate for C/S in A} = 104 \times 0.22 = 22.88$$

$$\text{Exp. Rate for V/D in A} = 104 \times 0.78 = 81.12$$

$$\text{Exp. Rate for C/S in B} = 96 \times 0.22 = 21.12$$

$$\text{Exp. Rate for V/D in B} = 96 \times 0.78 = 74.88$$

$$\begin{array}{lcl} \text{O} & = & 27.00 \\ \text{E} & = & 22.88 \\ \hline & & 4.12 \\ \hline \end{array} \quad \begin{array}{lcl} \text{O} & = & 77.00 \\ \text{E} & = & 81.12 \\ \hline & & 4.12 \\ \hline \end{array}$$

$$\begin{array}{lcl} \text{O} & = & 17.00 \\ \text{E} & = & 21.12 \\ \hline & & 4.12 \\ \hline \end{array} \quad \begin{array}{lcl} \text{O} & = & 79.00 \\ \text{E} & = & 74.88 \\ \hline & & 4.12 \\ \hline \end{array}$$

$$X^2 = \frac{(4.12)^2}{22.8} + \frac{(4.12)^2}{81.12} + \frac{(4.12)^2}{21.12} + \frac{(4.12)^2}{74.88}$$

$$\begin{aligned}
 &= 0.74 + 0.20 + 0.80 + 0.22 \\
 &= 1.96
 \end{aligned}$$

$P > 0.05$

To compare the Statistical Significance of Instrumental Delivery in A & B

	<b>I/D</b>	<b>ND</b>	<b>Total</b>
A (Control Group)	18	59	77
B (Study Group)	7	72	79
	-----	-----	-----
	25	131	156
	-----	-----	-----

$$\text{Proportion for I/D} = 25/156 = 0.16$$

$$\text{Proportion for N/D} = 131/156 = 0.83$$

$$\text{Exp. Rate for I/D in A} = 77 \times 0.16 = 12.32$$

$$\text{Exp. Rate for N/D in A} = 77 \times 0.83 = 63.91$$

$$\text{Exp. Rate for I/D in B} = 79 \times 0.16 = 12.64$$

$$\text{Exp. Rate for N/D in B} = 79 \times 0.83 = 65.57$$

$$\text{O} = 18.00 \qquad \text{O} = 59.00$$

$$\begin{array}{rcl}
 \text{E} & = & 12.32 \\
 & & \text{-----} \\
 & & 5.68 \\
 & & \text{-----}
 \end{array}
 \qquad
 \begin{array}{rcl}
 \text{E} & = & 63.94 \\
 & & \text{-----} \\
 & & 4.91 \\
 & & \text{-----}
 \end{array}$$

$$\text{O} = 7.00 \qquad \text{O} = 72.00$$

$$E = \frac{12.64}{5.64}$$

$$E = \frac{65.57}{6.43}$$

$$X^2 = \frac{(5.68)^2}{12.32} + \frac{(4.91)^2}{63.91} + \frac{(5.64)^2}{12.64} + \frac{(6.43)^2}{65.57}$$

$$= 2.6 + 0.37 + 2.51 + 0.63$$

$$= 6.11$$

$$P = \text{Value significant}$$

The induction of labour in Control Group undergoing Instrumental Delivery significantly differ from the study group undergoing induction of labour at 41 – 42 Weeks.

## STATISTICAL ANALYSIS

To compare the Statistical Significance of Perinatal Death in A & B

	<b>P/D</b>	<b>L/B</b>	<b>Total</b>
A (Control Group)	3	101	104
B (Study Group)	2	94	96
	-----	-----	-----
	5	195	200
	-----	-----	-----

Proportion for P/D	=	5/200	=	0.025
--------------------	---	-------	---	-------

Proportion for L/B	=	195/200	=	0.97
--------------------	---	---------	---	------

Exp. Rate for P/D in A	=	104 x 0.02	=	2.08
------------------------	---	------------	---	------

Exp. Rate for L/B in A	=	104 x 0.97	=	100.88
------------------------	---	------------	---	--------

Exp. Rate for P/D in B	=	96 x 0.02	=	1.92
------------------------	---	-----------	---	------

Exp. Rate for L/B in B	=	96 x 0.97	=	93.12
------------------------	---	-----------	---	-------

O	=	3.00	O	=	101.00
---	---	------	---	---	--------

E	=	2.08	E	=	100.88
		-----			-----
		0.92			0.12
		-----			-----

O	=	2.00	O	=	94.00
---	---	------	---	---	-------

E	=	1.92	E	=	93.11
		-----			-----
		0.08			0.88
		-----			-----

$$\begin{aligned}
X^2 &= \frac{(0.92)^2}{2.08} + \frac{(0.12)^2}{100.88} + \frac{(0.08)^2}{1.92} + \frac{(0.88)^2}{93.12} \\
&= 0.41 + 0.0001 + 0.003 + 0.008 \\
&= 0.42
\end{aligned}$$

Hence Perinatal outcome in the form of mortality is not statistically significant in 40 weeks and 41 weeks.

# *Discussion*

## DISCUSSION

The study population consists of 200 women who had gone beyond the expected date of confinement.

Primigravidae constitute 63% of them.

**Table : 1**

### INCIDENCE IN PRIMIGRAVIDAE

<b>AUTHORS</b>		<b>STUDY</b>
1.	Eden and Associates	38%
2.	Robert Volta	33%
3.	Campbell <i>et al</i> ,	42.3%
4.	Present Study	63%

Primigravidae constituted major proporpion

**Table : 2**

**HISTORYOF PREVIOS PROLONGED PREGNANCY**

<b>AUTHORS</b>	<b>STUDY</b>
1. Mogren <i>et al.</i> , <sup>67</sup>	12.5 - 15.8%
2. Bakketeig and Bergsio (1991) <sup>66</sup>	10-27%
3. Norwegian Study	27%
4. Present Study	20.2%

If mother has a H/o prolonged pregnancy, daughter has a 3 fold risk of having the same.

The tendency for some mothers to repeat post term births suggests that some prolonged pregnancies are biologically determined. (2-3 fold chance of the daughter giving birth to post dated baby).

**1a** Six randomised trials compare a policy of routine induction at 40 weeks, Cole *et al*, Martin *et al*, Tylleskar *et al*, Breart *et al*, Sande *et al*, Egarter *et al.*,) against expectant management till 42 weeks gestation.

These trials reveal no evidence of any major benefit or risk to routine induction at 40 weeks. There was no effect on caesarean section. **But obviously, induction around 40 weeks reduced the incidence of meconium staining in the labour.** In the Indian Study, induction at 40 weeks associated



with high incidence of instrumental vaginal delivery and this effect not seen with induction between 41-42 weeks. This effect is same in our study.

**1b .** 14 Trials involving 6,284 women were identified in which induction of Labour after 41 weeks of gestation is compared with expectant management using a variety of tests to monitor. Henry 1969, Katz *et al.*,

1983, SuikJkari *et al.*, 1983, Cardozo *et al*, 1986, Augensen *et al.*, 1987, Dyson *et al.*, 1987, Witter & Weitz 1987, Bergsjo *et al*, 1989, Martin *et al*, 1989, Heden *et al.*, 1991, Hannah *et al*, 1992, Herabutya *et al.*, 1992, NIHCD 1994, Roach & Rogers (1997), of which Hannah *et al*, (1992) study is larger and contributes considerable weight to Meta Analysis and systematic review of these trials indicate:- INDUCTION AT 41 WEEKS IS ASSOCIATED WITH BENEFITS:-

According to the above study

1. There is reduced risk of perinatal death in normally formed Babies.
2. The incidence of Meconium stained Amniotic fluid is reduced.
3. There is no effect on fetal heart rate abnormalities.

## **MATERNAL OUTCOME**

1. Induction after 41 weeks of gestation, does not increase the caesarean section rate.
2. Hannah *et al.*, states that there is reduced risk of caesarean section.

Secondary Analyses were carried out to verify the above statement and they showed induction of labour after 41 weeks of pregnancy does not increase the caesarean section rate, irrespective of parity, cervical ripeness, method of induction

**Table : 3**

**DEFINITION OF POST TERM BY VARIOUS AUTHORS**

<b>S. NO.</b>	<b>STUDY</b>	<b>COUNTRY</b>	<b>NO. OF DAYS OVERDUE</b>
1.	WHO 1994	Geneva	294
2.	FIGO	-	294
3.	Kaiz <i>et al.</i> , 1983 <sup>39</sup>	Israel	294
4.	Bergsjö 1989 <sup>40</sup>	China	294
5.	Herabutya 1992 <sup>41</sup>	Thailand	294
6.	Roach 1997 <sup>42</sup>	China	294
7.	Augensen 1987 <sup>43</sup>	Norway	290
8.	Chanrachakul 2002 <sup>44</sup>	Thailand	290
9.	Dyson 1987 <sup>45</sup>	USA	287
10.	Witter 1987 <sup>46</sup>	USA	287
11.	Martin 1989 <sup>47</sup>	USA	287
12.	NIHCD 1994 <sup>48</sup>	USA	287
13.	Hannah 1992 <sup>49</sup>	Canada	287
14.	James 2001 <sup>50</sup> (Indian Study)	India	287
15.	Prabha Singal <sup>51</sup> (Indian study)	India	281

Indian studies stated above vote for 287 days, and also the famous Hannah study (n=3407 women) also says that definition of post term is 287 days.

Another Indian study<sup>52</sup> say that certain ethnic groups such as Indians have a tendency towards early maturity and predisposes to post mature state even at 40 weeks of gestation and hence they require Antenatal surveillance before 40 weeks. More Indian studies are warranted. There is progressive uteroplacental insufficiency as pregnancy cross 40 weeks.<sup>69</sup>

**Table : 4**

**VARIOUS METHODS OF INDUCTION USED BY DIFFERENT  
AUTHORS**

<b>S.No.</b>	<b>STUDY GROUP</b>	<b>METHODS OF INDUCTION</b>
1.	DYSON	PGE <sub>2</sub> gel intravaginally & oxytocin infusion with amniotomy
2.	WITTER	Oxytocin & amniotomy
3.	BERGSJO	Membrane stripping, oxytocin infusion & amniotomy
4.	NIHCD	PGE <sub>2</sub> intracervically, oxytocin infusion, and amniotomy
5.	HANNAH	PGE <sub>2</sub> gel (0.5mg) Intracervically every 6hx3, and oxytocin infusion, amniotomy or both
6.	JAMES (INDIA)	Extra amniotic saline infusion if bishop score <5, if >5 membrane stripping, amniotomy, and oxytocin infusion.
7.	PRESENT STUDY	PGE <sub>2</sub> (0.5mg) Gel intracervically, oxytocin induction, amniotomy

The common indications for INDUCTION: at 40 weeks and above;

1. Reduced fetal movement by patient history
2. Oligohydramnios
3. Favourable cervix
4. Patient request

**Table : 5**

**MECONIUM STAINED AMNIOTIC FLUID**

<b>S. No.</b>	<b>AUTHORS</b>	<b>40 WKS</b>	<b>41 WKS</b>
1.	Meis <i>etal</i> , 1978	30%	-
2.	Steer ef a/., 1989 <sup>56</sup>	30%	-
3.	Miller & Read 1981 <sup>57</sup>	30%	-
4.	Williams Obstetrics <sup>58</sup>	21%	25%
5.	Present Study	15.5%	20%

This is not a specific indicator of fetal hypoxia, but there is good evidence that cord arterial blood PH is lower in babies who show FHR abnormalities with meconium stained fluid than in FHR abnormalities with clear liquor<sup>73</sup>.

**TABLE 6**  
**CAESAREAN SECTION – INCIDENCE**

S. No.	AUTHORS	At 41 Wks
1.	Hannal <i>et al.</i> ,	24%
2.	NICHD	18%
3.	Alexander and Co-workers	9%
4.	Present Study	17%

From the Statistical Analysis,

Induction of labour after 41 weeks does not increase caesarean section rate.<sup>27</sup> This result was the same as that of review of meta analysis of 14 trials involving 6,284 women, (henry<sup>53</sup>, Katz *et al.*,<sup>79</sup> Suikkari *et al.*,<sup>54</sup> Cardazo *et al.*, Augensen<sup>43</sup> *et al.*, Dyson *et al.*,<sup>45</sup> Witter<sup>46</sup> & Weitz, Bergsjö *et al.*,<sup>40</sup> Martin *et al.*,<sup>47</sup> Heden *et al.*,<sup>78</sup> Hannah *et al.*, Herabutya *et al.*,<sup>41</sup> NICHD,<sup>48</sup> Roach<sup>42</sup> & rogers of which Hannah<sup>49</sup> *et al.*, study is much large

Perinatal outcome is not statistically significant from those induced at 41 weeks. Six randomized trials compare routine induction at 40 weeks Vs expectant Management (Cole *et al.*, Martin *et al.*,<sup>47</sup> Tylleskar *et al.*, Breart *et al.*, Egarter *et al.*,<sup>82</sup> Sande *et al.*, These trials reveal no evidence of any major benefit or risk to routing induction at 40 weeks. This was found in our study.

India being a developing country, has still a long way to go before achieving the perinatal mortality rate as that of the western countries.

**Table 7****PERINATAL OUTCOME**

<b>S. No.</b>		<b>40 Weeks</b>	<b>&gt; 41 Weeks</b>
<b>A.</b>	<b>Macrosomia</b>		
1.	Eden & Associates	0.8%	2.8%
2.	Present Study	0.96%	2.3%

<b>B.</b>	<b>Meconium Aspiration</b>		
1.	Eden & Associates	0.6%	1.6%
2.	Present Study	-	3%

<b>C.</b>	<b>Apgar Scores &lt;7 at 5 min</b>		
1.	Luis Sanchez <sup>(60)</sup>	1.1%	1.4%
2.	Present Study	2.8%	7%

<b>D.</b>	<b>NICU Admissioma</b>		
1.	Luis Sanchez	11.7%	12.5%
2.	Present Study	12%	8.3%

**TABLE 8**

<b>E.</b>	<b>Gestation Specific Perinatal Mortality Rate / 1000</b>	<b>40-41 Weeks</b>	<b>41-42 Weeks</b>
1.	Bakketeig & Bergsjö <sup>61</sup>	2.3	2.4
2.	Ingemarsson & Kallen	3.65	2.14
3.	Hilder <i>et al.</i> ,	6.63	6.45
4.	Williams	1.5	0.7
5.	Mcclure <i>et al.</i> , with out AP testing (1958)	10	1
6.	C Advent of AP testing Eden <i>et al.</i> ,	1.5	-
7.	Prabha Singal (Indian Study)	14	-
8.	Present Study	28.8	20.8

Our Indian study quotes perinatal mortality in 40 weeks and above as 14%. In our study also there is no statistical difference in PNMR between 40 weeks and 41 completed weeks.

# *Summary*



## **SUMMARY OF THE STUDY**

1. The study population consisted of 200 women who had regular cycles and they had crossed the expected date of delivery.
2. Of these 96 women had crossed the gestation beyond 41 weeks but less than 42 weeks and 104 women had completed 40 weeks of gestation but less than 41 weeks.
3. There were 126 (63%) Primigravida
4. Previous History of overdue pregnancy that has gone beyond dates – 20.2%

## **WOMEN OF CONTROL GROUP**

1. In the control group in whom the gestation age crossed 40 weeks but less than 41 weeks, women enrolled were 104.
2. Of the various modes of induction, 78.5% induced with PGE2 gel, 21.5% induced with oxytocin
3. 56.73% had natural delivery
4. Outlet forceps delivery constituted 12 (11.5%) and low forceps 6 (5.76%) so total operative vaginal delivery for those who delivered in this group was 18 (17.26%)
5. caesarean in the 40 – 41 weeks group 27 (25.96%)

### IN WOMEN OF study group

1. In the study group in whom the gestation age crossed 41 weeks but less than 42 weeks, women enrolled were 96
- 2a. Of the various modes of induction, 74 (77.08%) induced by PGE<sub>1</sub> gel, and 22 (22.91) induced by oxytocin.
- b. Overall meconium staining in this group = 19 (20%) of which

10 were Grade I, 2 were Grade II, 7 were Grade III,	Meconium Stained
---	------------------
3. 72 (75%) had natural delivery and 17 (17.7%) went for caesarean section and 7 (7.3%) were delivered by operative vaginal delivery, of which outlet forceps constituted 5 (5.2%) LMC forceps 2 (2.1%)

### PERINATAL OUTCOME IN CONTROL GROUP

- a. Birth weight distribution in Kg

< 2.5	-	26
> 2.5	-	75
> 3.5	-	1
< 2	-	2
		-----
		104

-----

b. Apgar score AT 5 MIN < 7

$$= 3 (2.8\%)$$

c. NICU Admission Rate

$$= 12 (12\%)$$

d. Mortality rate

$$= \frac{3}{104} * 100 = 2.88\%$$

$$= \frac{28.8}{1000}$$

## PERINATAL OUTCOME IN STUDY GROUP

a. Birth weight distribution

< 2.5	-	21
> 2.5	-	70
> 3.5	-	2
< 2	-	3

-----

96

-----

b. Apgar score AT 5 MIN < 7

$$= 7 (7\%)$$

c. NICU Admission Rate

$$= 8 (8.3\%)$$

d. Mortality rate

$$= \frac{2}{96} * 100 = 2.08\%$$

$$= \frac{20.8}{1000}$$

*Conclusion*

## CONCLUSION

Whenever a pregnant women crosses her date of confinement, the patient becomes anxious, and the obstetrician keeps the finger crossed.

From the study conducted, we get the inference that the caesarean section rate is reduced from 25.96% to 17.7% ,when the labour is induced at 41 weeks i.e,one week beyond the expected date of confinement.

Aiso , the instrumental delivery rate is low(7.3%) in the study group compared to the control group(17.26%).

Eventhough the meconium staining of liquor is high in the study group(20% vs 15.5% ), NICU admission and perinatal mortality is comparatively lower in the Study group.

So the induction of labour optimally in otherwise uncomplicated pregnancies, at 41weeks is associated with reduced maternal morbidity and no adverse effect on the perinatal outcome.

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*Proforma*

## PROFORMA

1. S.No. :
2. Name :
3. Age :
4. IP No.:
5. Unit :
6. Socio Economic Class:
7. Obstetric Index:
8. LMP:  
EDD:
9. No. of days after EDD:
10. Booked / booked outside
11. Menstrual history:
12. Previous Obstetric History:
  - a) H/o previous postdated pregnancies
  - b) Mode of delivery
  - c) Condition of the baby and age
13. H/o of contraception:
14. Other medical disorders:

15. Obstetric Examination:

- a) Uterine Size
- b) Amount of liquor
- c) Presentation
- d) Estimated baby weight

16. Bishop's Score:

17. USG:

Presentation

BPD FL

AC HC

Liquor AFI

18. NST

19. Induction at 40 weeks / 41 weeks

20. Mode of Induction:

- a) Oxytocin
- b) PGE Gel
- c) Others

21. Acceleration:

- a) ARM
- b) Oxytocin

22. Colour of Liquor:

23. Amnio infusion:

- a) Yes
- b) No

24. Duration of Labour:

- a) I Stage
- b) II Stage

25. Mode of delivery:

- a) Natural
- b) Instrumental
  - Forceps, outlet, LMC – indication
  - Vacuum
- c) LSCS – Indication

26. Baby:

- a) Weight
- b) Sex
- c) Apgar
- d) Features of post maturity
- e) MAS
- f) Congenital Anomalies
- g) Neonatal admission – Reason

27. Outcome:

- a) Mother
- b) Baby

## KEY WORDS

G	-	Gravida
P	-	Para
L	-	Livebirth
A	-	Abortion
LMP	-	Last Menstrual Period
EDD	-	Expected Date of Delivery
NICU	-	Neonatal Intensive Care Unit
H	-	Healthy
GA	-	Gestational Age
UT	-	Uterus Term
A	-	Amniotomy
FHG	-	Fetal Heart Good
M1	-	Meconium Stained, 1 Grade
C	-	PGE <sub>2</sub> , GEL, Induction
OXY	-	Oxytocin
C	-	Clear
LN	-	Labour Natural
LSCS	-	Lower Segment Caesarean Section
B	-	Boy
G	-	Girl
ST	-	Sterilisation
LR	-	Liquor Reduced